

01-09-12 Preliminary Draft Comments from Clean Air Scientific Advisory Committee (CASAC) Ozone Review Panel. These preliminary pre-meeting comments are from individual members of the Panel and do not represent CASAC consensus comments nor EPA policy. Do not cite or quote.

**Preliminary Comments from Dr. Kathleen Weathers on**  
**EPA's Integrated Science Assessment for Ozone and Related Photochemical Oxidants**  
**(Second External Review Draft – September 2011)**  
**(Updated January 9, 2012)**

**Charge Question for Chapters 1 and 2**

*Please review and comment on the effectiveness of these revisions. Please comment on the extent to which Chapters 1 and 2 comprise a useful and effective approach for presenting this summary information and conclusions. Please recommend any revisions that may improve the scientific accuracy of these summary sections and the conclusions therein.*

**General Comments:**

The revisions on the first three sections are very useful. Kudos to the EPA. My overarching comments have to do primarily with the integrative and/or conceptual figures. I suggest that some specific attention be paid to modifying them so that they become more useful.

**Specific Comments:**

Chapter 1 could use thorough editing. I found much of the text to be rather awkwardly written (and/or punctuated) and not particularly clear.

Section 1.2 Scope: 4<sup>th</sup> line from bottom—I think that the phrase “entire body of relevant literature” should be qualified: Peer reviewed literature? Published? Agency reports? All of the above?

Section 1.3.

The readers might be reminded of the spatial extent of stratosphere and troposphere when the terms are first used, for example, troposphere (from ground level to xxkm....)

Smaller spatial scale (2<sup>nd</sup> para under Figure 1-1).

The schematic overview (Fig. 1-1-- and also again as Fig 2-1) is confusing to me. First, what's the significance of the colors (red vs blue, vs graded blue)? It's not clear. Second, similar to the comment above, some scale information would be helpful (e.g., approximate distances for troposphere and stratosphere, perhaps some information on relative speed of reactions). I'm also unclear to what “rainout deposition” refers—nitric acid? Also to what does aerosol uptake refer, and is it really gaseous uptake that is meant (but, again, of what?). Finally, the figure contains a mix of processes (e.g., reactions with UV), effects (e.g., ozone hole), and avenues of effects (aerosol uptake), which I find a little confusing.

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When the figure is modified, the figure legend should also be made more specific and informative (ditto for all of the figures in this document).

## **Comments on Chapter 2**

See comments about Fig. 1.-1 (and therefore 2-1), above.

The CASTNET description should be checked for accuracy. CASTNET is a very important national network for measuring and tracking air chemistry trends and continental contrasts; it does monitor air concentrations of several pollutants of interest, and, up until recently, CASTNET modeled components of dry deposition, however it does not measure dry deposition.

2.3.4: It's unclear to me on what basis the CSAs were selected. It's also unclear to me what "closer analysis" means. The poor correlations for some regions beg the question of whether the groupings are relevant/defensible.

2.5: Upon inspiration?!

## **Charge Question for Chapter 9**

*Please comment on the reorganization and content of this chapter and the adequacy, scientific soundness, and usefulness of the material presented. Please recommend any revisions to improve the discussion of key information.*

This version of Chapter 9 reads quite well. However, there are sections that could benefit from clarification.

### **General comments:**

As is pointed out in the document, ecosystems can be (spatially) small or large, depending upon the question and the boundaries (assigned logically and defensibly, but still assigned by a person). However, throughout the text, ecosystem "scale" appears, which is confusing. I have noted a few places below where (and how) something else might be substituted in; I suggest changing it throughout the document. I also think being as explicit as possible when referring to scale, whether it is temporal or spatial, will make the text much less ambiguous.

I'm a little confused by places in the document that state "...since the 2006 Ozone AQCD, there is additional evidence" and then invoke studies from the 1990s and early 2000s.

### **Specific comments:**

Figure 9-1: see comments below about the use of "endpoints."

9-36, Summary. I think it might be useful to put the "needs" together in this section.

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9-39, lines 16+: This section could use some editing. Here are a few suggestions: “Ecosystems *can be described, in part*, by their structure, i.e., the number...”, (line 26) “Plants, via such processes as photosynthesis, respiration, C allocation, nutrient uptake and evapotranspiration, affect energy flow, C and nutrient cycling, and water cycling.

9-40, lines 1-4: why isn’t nutrient cycling included?

9-40, lines 9-13: delete.

Section 9.4.2: The header here seems not quite right. The section might be more appropriately titled something like: “Ozone exposure and Plants: visible foliar injury and use as biomonitors.

Hasn’t ozone injury been linked to reductions in aesthetic value of landscapes? If so, it should be noted.

9.4.2.2. Summary, 9-45, line 2: but, what is new evidence of the correspondence of foliar injury and high ozone levels? I’m not convinced that the final statement is described as clearly as it might be in the section.

9.4.3., 9-45, line 19: suggest using the “stand” scale, not ecosystem scale. Further, lines 19-21: “....translate to the *stand* scale, and result in changes....t

There are several places throughout the chapter where a simple phrase reminding the reader of the salient results of the previous AQCD would be a helpful addition, for example: 9-48, line 22 “...the conclusion of the previous AQCD *that...*?” and Page 9-47, line 27 “....were evaluated in previous AQCDs *demonstrating that...*?”

Page 9-47, paragraph starting on line 30: Endpoint does not seem to be the right word or concept here. Isn’t it a metric? For example lines in 32-33, is the point that effects on biodiversity are as important as C fixation? Or that biodiversity can affect C fixation?

9.4.3, lines 20 and 21: I’m not sure that demonstrating the relevance of knowledge gained from trees grown in open-top chambers is an important bottom line (as part of the Summary).

9-54: Make clear the range of spatial scales that “local, regional and global scales” are referring. I also suggest adding the definitions of and relationships among GPP (and Photosynthesis if it is different from GPP in these studies), NEP, NPP R (autotrophic and heterotrophic) at the beginning of the discussion. Also, NEE, etc.. (especially since it is invoked in the Summary). I think that describing the results of the various studies could be made clearer and more comparative if you do so.

9-57: Summary, line 11: To what does “reduced ecosystem productivity” (e.g. NEP—see comments above about defining, and using consistently, terms).

9.4.4: Similar to the comment above, I suggest defining growth, yield and any related terms at the beginning of the section. The definition could go in the Figure/Table legend, in fact.

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Figure 9-7: Fix legend.

9-51, line 4 "...changes in productivity at the ecosystem scale." See comments re: ecosystem scale.

Table 9-2: consider adding the spatial resolution of each model (as is done for TEM) for each of the models.

9.4.3.5. Summary: There's another reference to "ecosystem level." Also, please be specific (line 11 as well as lines 30-32)—which productivity? Whether it is GPP or NEP, for example, makes a difference.

Table 9-3: I find this a useful table. Add ecosystem type(s) to each of the studies.

9.4.6: Consumption (line 24)? Allocation seems a more appropriate word.

9-74, line 29: Ca (vs calcium ion).

9.4.6.3: An increase in root mortality and change in turnover rates would be indirect effects. This is an unclear sentence (lines 27,28).

9.4.6.4: It seems to me that pools and fluxes are not well distinguished in this section.

9.4.6.5: I found this section very confusing. If cores are brought from an anaerobic into an oxygenated environment they should/would be significantly impacted.

9.4.6.6: Summary (line 8). Below-ground processes are fueled by C, but microbes drive the processes. There's some more confusion in this section about what "ecosystem level" responses are, and are not (ecological might be a logical substitution; see comments above).

9-86, lines 28,29): The summary sentence seems a bit too broad given the caveats in the preceding section (community composition vs some qualification of which communities).

9.4.8.3: Rather than physical factors, why not simply say: temperature, light and moisture?

Table 9-8: The N additions range from reasonable to outrageous (436 kg/ha/yr), unless of course, these additions mimic commercial watermelon N applications.